AMENDMENTS TO THE ABSTRACT

Please amend the claims as indicated below. The language being added is underlined ("__") and the language being deleted contains either a strikethrough ("—") or is enclosed by double brackets ("[[ ]]").

Please substitute the following annotated paragraph for the abstract:

A method and apparatus for encoding data bits in a DMT modulation system is ~~providing~~ provided utilizing a 64-state Trellis encoder to achieve further improvement in the achievable coding gain by employing coset partitioning, bit conversion, and constellation ~~encoder~~ encoding that fit the DMT modulation. The coding gain of the new coder is around 5.63 dB, which is about 0.96 dB higher than the current Trellis coder in the DMT standard.

Please substitute the following annotated paragraph for paragraph 0003:

[0003] The explosive growth of internet has created a demand for high data rates for home users that rely on standard analog plain old telephone systems (POTS) that use a copper wire twisted pair to carry the information. The need for high-speed access to the home is inevitable due to the availability of information, data, high-bandwidth video and the like from the world wide web and because of such demand, higher speed modems are required[[;]]. [[m]]Modems operating at higher rates of up to 33,600 bits/second are in use nowadays. A multitude of competing communication technologies provide high-speed access to the home such as cable modems, digital subscriber line (xDSL) that utilizes the existing analog plain old telephone systems (POTS) that use a copper wire twisted pair to carry the information. Because of bandwidth limitation (4 KHz), and power limitation of the telephone network, line coding schemes are used to

encode digital signals into analog signals that convey the analog information over the analog telephone network, such line coding schemes should avoid [[the]] undesirable bandwidth or power increase. The line coding schemes manipulate the analog carrier signal which has three attributes[[,]] (amplitude, phase and frequency) of which one or more of such attributes [[being]] are manipulated by known modulation techniques, one of which is quadrature amplitude modulation (QAM) whereby the carrier signal's phase and amplitude is modulated in order to encode more data within a frequency bandwidth. One example of a QAM modulation system sends two bits of information per QAM symbol, where the digital values can be encoded and the corresponding amplitude and phase can be represented using the constellation. By increasing the constellation size and in the meantime the bit density per symbol will be increased, hence achieving higher data rates. As the constellation size increases, the granularity of the phase and the amplitude difference between different constellation points diminishes, making it increasingly difficult to decode the constellation points, ~~specially~~ especially in the presence of noise. One way of circumventing such a problem is to increase the Euclidean distance between symbols employing Trellis coding which is a bandwidth efficient, since the symbol rate and, hence the bandwidth is not increased. As the constellation size gets bigger, the problem of detecting constellation due to density increases and shorter Euclidean distance between symbols, therefore it is desirable to introduce redundancy without doubling the constellation size. Therefore, a way of counter-acting the effects the short Euclidean distance between symbols is to partition the quadrature amplitude modulated signal into subsets, thereby creating an acceptable Euclidean distance between symbols.